URS

Draft Technical Memorandum

To: Ellie Hale
EPA Region 10

From: Jim Scott

Office: Denver, Colorado

Date: December 20, 2001

Subject: Midnite Mine, Detail Area 4
Project No. 53F4001800.01 Task 18110

As requested in your Technical Direction Letters dated September 10 and December 10, 2001, we have performed an evaluation of the Detail Area 4 waste rock/overburden slope east of Pit 4 at the Midnite Mine site. Our evaluation included a review of documents provided to us by EPA Region 10 and Shepherd Miller, Inc. (SMI). A site reconnaissance visit by URS to the subject Detail Area 4 was not conducted for the evaluation.

This memorandum is comprised of the following sections:

- Introduction
- Documents Reviewed
- Background Information
- Corrective Actions/Monitoring of Detail Areas
- Conclusions and Recommendations
- General Information
- Figures
  - Detail Area 4 Cross-Section Locations (Fig. 1)
  - Detail Area 4 Cross-Sections (Fig. 2)
- Attachments
  - List of Documents Reviewed (Attachment A)
  - SMI Detail Area 4 Location Figures (Attachment B)
  - Monitoring Well Logs (Attachment C)

Introduction

On April 23, 1997 the Bureau of Land Management (BLM) issued a Mine Order addressing three (3) areas of concern for slope stability associated with the waste dumps at the Midnite Mine. These areas were designated as Detail Areas 1, 2, and 3. Detail Areas 1 and 2 are located on the South Spoils (Gully) waste dump and Detail Area 3 is located east of the Lime Protore Stockpile # 8. These areas were reportedly identified in the spring of 1997 following a winter period of above average precipitation and rapid snowmelt. An additional area located east of Pit 4 (Detail Area 4) was included by Dawn Mining Company (DMC) in their Slope Stability Plan on July 30, 1997.

Documents Reviewed

Numerous project documents including letters, letter reports, and photographs were reviewed during our evaluation. The documents were prepared by various organizations including the BLM, DMC, and SMI. A list of the documents reviewed is provided in Attachment A.

Background Information

Detail Area 4

Background information for Detail Area 4 is provided below. Additional information of Detail Area 4 can be found in the documents listed in Attachment A.

Detail Area 4 is located at an area of slope movement observed by SMI personnel in April 1997 along an unnamed waste dump slope on the east side of Pit 4. SMI documents indicate the area has a head scarp, tension crack area, and debris flow area associated with it. Detail Area 4 appears to be located near the east property boundary of the mine site. Attachment B provides Detail Area 4 location figures prepared by SMI.

The existing and pre-mining ground surfaces were obtained from topographic maps developed by the BLM and provided to us by SMI in 1999. The following information which will be used for the FS describes the generalized existing configuration of Detail Area 4.

- Approximate maximum height: 100 to 150 ft
- Approximate maximum thickness of mine rock: 65 to 95 ft
- Approximate overall slopes: 1.4H to 1.6H:1V (32 to 35 degrees)
- Approximate volume 400,000 yd^3

A pair of deep/shallow monitoring wells (MWNE-1 and MWNE-2) was drilled by URS in 1999 near the toe area of Detail Area 4 and provide existing subsurface information on soil types and ground water depths. The wells showed about 17 feet of sands and gravels over bedrock. The

depth to water in the two wells was 23 and 21 feet, respectively in August 2001. This corresponds to elevations 3078 and 3080.6, respectively.

Figures 1 and 2 were prepared based on pre-mining and existing topography provided by the BLM. Figure 1 provides the locations of 3 cross sections in the Detail Area 4. Figure 2 provides the cross sections and shows both the pre-mining and existing ground surfaces.

Precipitation

Data reported by NOAA and the USGS were found that show that 1997 was an unusually wet year in the region of Spokane and in the site vicinity. The USGS stream flow data from stream gages in the site vicinity indicate the 1997 annual mean flow in Blue Creek exceeded the mean flows recorded since 1984. Long term precipitation data from the Spokane airport reported by NOAA indicate the average annual precipitation for the years 1895-2000 is about 15.2 inches. In 1997, the annual precipitation at the Spokane airport was about 25 inches, which is the wettest year of record during the period 1895-present. Since 1997 the annual precipitation in Spokane has been about average or slightly above average except for the year 2000, in which about 20.5 inches of precipitation occurred. These data suggest that the slope movements during 1997 are related to the unusually wet weather during that year and that extremely wet weather has not occurred during the period of DMC slope stability monitoring since 1997. Precipitation data collected by DMC at the Midnite Mine site from approximately September 1998 through April 2001 shows the same.

Corrective Actions/Monitoring

Detail Area 4 is a waste dump slope that has not been reclaimed or revegetated. Corrective actions reportedly have involved mitigating the cause of erosion on the slope and the retention of sediment at the toe of the slope. Corrective action reportedly has included modification of upstream drainage, construction of a catch bench at the toe of the slope, and installation of downstream drainage retention structures. Details of the corrective actions are provided in SMI (1997d).

Eight (8) survey movement monuments were reportedly installed at Detail Area 4 in November 1997 but they have never been surveyed. Installation and location details of the monuments are provided in SMI (1997d).

SMI (1997d) states that Detail Area 4 will be inspected on a regular basis and after major storm events for visible signs of movement. SMI (1999) reports that Detail Area 4 was inspected by SMI personnel in 1998 and because no evidence of movement was observed, the monuments were not surveyed in 1998.

SMI (2000) reports that Detail Area 4 has been inspected since 1997, and although erosion and surface movement in the slope has occurred, it has been anticipated and is the result of

precipitation directly on the slope. SMI also states that all four detail areas should be inspected before and after the winter season for signs of erosion or slope movement.

Slope stability analyses have not been performed for the waste dump slope at Detail Area 4.

Conclusions and Recommendations

Based on the information reviewed our conclusions and recommendations regarding Detail Area 4 are provided below.

- Cross sections developed by URS from a recent topographic base map and a pre-mining topographic map indicate the maximum height of 100 to 150 feet and a maximum thickness of dump material of 65 to 95 feet. The approximate volume of material is 400,000 yd^3.
- Corrective actions reported by SMI have included mitigating the cause of erosion on the slope and the retention of sediment at the toe of the slope. These actions, which were performed by Renco Contracting, Inc. in 1997 under supervision of SMI, include the following:
    - Modification of upstream drainage
    - Construction of a catch bench at the toe of the slope
    - Installation of downstream sediment retention structures
- Survey monitoring data are not available to evaluate whether slope movement has occurred because the movement monuments that were installed in Detail Area 4 have reportedly never been surveyed. The necessity for monitoring the existing monuments should be evaluated based on the site reconnaissance discussed below.
- Detail Area 4 has been inspected since 1997 by SMI (SMI 1999, SMI 2000). Documentation of the inspections (i.e., inspection checklists, written reports, written observations) have not been received or reviewed. No documentation of inspections in 2001 have been received or reviewed.
- Slope stability analyses have not been performed for the waste dump slope at Detail Area 4. We recommend that such analyses be performed if any of the remedial alternatives to be evaluated in the FS would include a provision for not completely removing the waste rock material in Detail Area 4 and relocating it. The results of field investigations and laboratory testing for the South Spoils and Hillside Dumps can be used to develop material properties for the stability analyses.
- We recommend a site reconnaissance of Detail Area 4 be performed twice annually, before and after the winter season, until the materials in Detail Area 4 have been further stabilized or removed as a part of the overall site remediation. Observation of the South Spoils and

Hillside Dumps could be included with the site reconnaissance efforts. This site reconnaissance should be performed and documented by a qualified geotechnical engineer or engineering geologist. Field observations should include:

- General area conditions
- Site conditions (crest, slope, toe areas)
- Surface conditions (slope, crest)
- Cracking
- Slides/sloughs/scarps
- Erosion

General Information

URS warrants that our services are performed within the limits prescribed by our clients with the usual thoroughness and competence of the engineering profession. No other warranty or representation either expressed or implied, is included in our scopes of work, reports, or memorandums.

The present condition of Detail Area 4 may change and may not represent the condition of the area at some point in the future. Only through periodic inspections can unsafe conditions be detected, so that corrective action can be taken. Likewise continued care and maintenance are necessary to minimize the possibility of development of unsafe conditions.

(2 copies sent)

Attachments
cc: File

ATTACHMENT A

LIST OF DOCUMENTS REVIEWED

Bureau of Land Management. 2001a. Table titled "BLM Spokane District Analysis of Slope Stability at Midnite Mine for Detail Areas 1-4, Following Corrective Measures Taken in 1997", February 27.

Bureau of Land Management. 2001b. Letter to Ellie Hale regarding Midnite Mine, March 6.

Bureau of Land Management. 1997. Memorandum titled “Stability Investigation to Evaluate Potential Overburden Slope Movement at the Midnite Uranium Mine, Spokane Indian Reservation: March-May 1997,” September 23.

Bureau of Land Management. 1996. Mine Order, Slope Stability, April 23.

Dawn Mining Company. 2001. Letter to BLM (Kelly Courtright), February 14.

Dawn Mining Company. 1997. Letter titled "Dawn Mining Company: Mine Order of April 23, 1997", June 30.

Shepherd Miller, Inc. 2000. Letter titled "Midnite Mine Waste Dump Slope Stability Monitoring of BLM Detail Areas", September 27.[(1)]

Shepherd Miller, Inc. 1999. Letter titled "Midnite Mine, Inspection and Survey Results for Slope Areas", February 10. [(1)]

Shepherd Miller, Inc. 1997a. Letter to Robert Nelson, DMC, March 21.

Shepherd Miller, Inc. 1997b. Letter to Robert Nelson, DMC, April 11.

Shepherd Miller, Inc. 1997c. Letter titled "Midnite Mine, Summary of Corrective Action - Detail Areas 1, 2, and 3", October 20. [(1)]

Shepherd Miller, Inc. 1997d. Letter titled "Midnite Mine, Summary of Corrective Action - Detail Area 4", December 30. [(1)]

[(1)] Included with SMI’s transmittal letter dated September 14, 2001.

ATTACHMENT B

SMI Detail Area 4 Location Figures

ATTACHMENT C

Monitoring Well Logs